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(54) Hair protection composition and method.

(57) A composition for maintaining the integrity of the hair comprising (a) at least one ceramide or glycoceramide, (b) at least one cholesterol ester, and (c) a cosmetically acceptable vehicle. The composition may be applied to the hair as a shampoo or conditioner.

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HAIR PROTECTION COMPOSITION AND METHOD

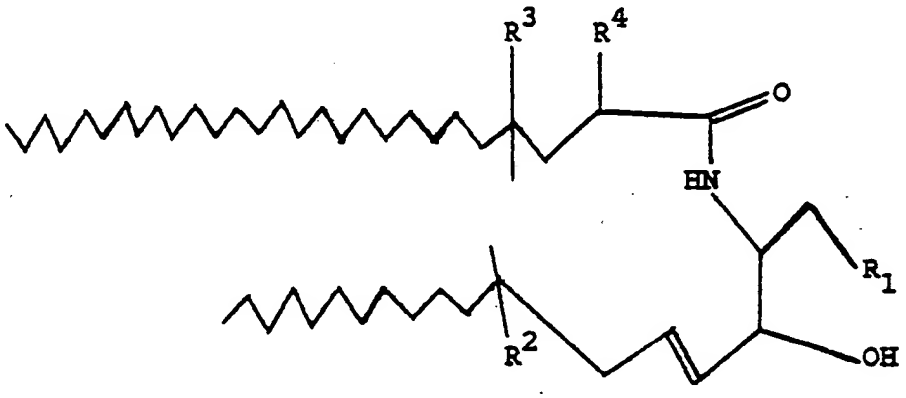
The present invention relates to compositions and methods for maintaining the integrity of the hair.

The hair's outer surface, the cuticle, is composed of cells that are held together tightly by a mixture of lipids and proteins. Bleaching, exposure to ultraviolet light, and permanent wave treatments weaken the linkages between the cuticle's cells. Once these linkages are weakened, everday washing, even with mild shampoos, extracts proteins, amino acids and other essential ingredients from the hair, thereby even further weakening the linkages. If left unchecked, that can lead to excessive dryness, brittleness, split ends, and lack of manageability of the hair.

The present invention is based on the discovery that certain cholesterol esters when combined with either certain ceramides or certain glycoceramides inhibits substantially the extraction of proteins and amino acids from the hair. Such extrac tions occurs, for example, when the hair is exposed to shampoos.

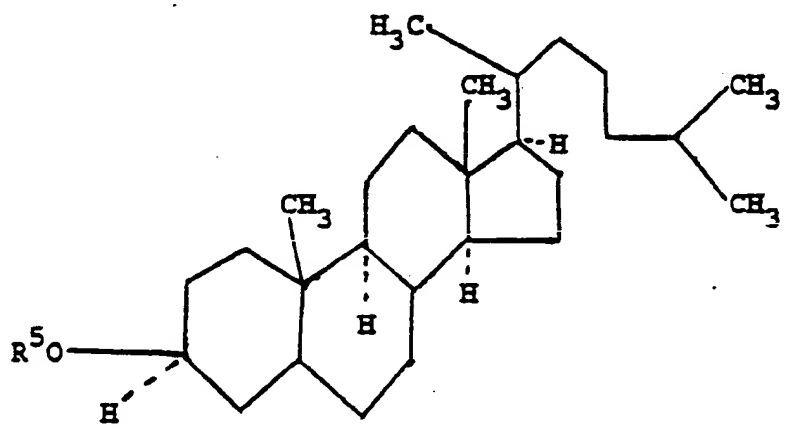
More particularly, the present invention relates to a hair protection composition for application to the hair comprising:

a) at least one ceramide or glycoceramide having the formula



wherein R^1 is -OH, O-glucose$_n$ wherein n is an integer from 1 to 4, or O-galactose$_m$ wherein m is an integer from 1 to 8, R^2 is C_{11} to C_{16} alkyl, R^3 is C_{12} to C_{26} alkyl, and R^4 is hydrogen or hydroxy; and

b) at least one cholesterol ester of the formula



wherein R^5 is HO_2SO-, CH_3COO-or $HOOC(CH_2)_pO$-wherein p is an integer from 9 to 17, and

c) a cosmetically accpetable v hicle.

When the foregoing constituents are combined all or part of component (a) may form a weak complex with component (b). It should be understood, therefor , that the composition of the present invention includes both mixtures of the foregoing constituents as w ll as complexes formed from the constituents.

The composition of the invention comprises a ceramide or glycoceramide in combination with a chol sterol ester incorporated into any cosmetically acceptable vehicle adapted for application to th hair,

such as a shampoo or a conditioner. Such vehicles, of course, should not be irritating or otherwise harmful to the skin and the resulting product should, preferably, have a pleasant odor or be odorless.

Shampoo formulations of the present invention generally will contain an effective amount of ceramide or glycoceramide, an effective amount of cholesterol ester, water, and a cleaning agent (e.g., a surfactant and/or a detergent) and, optionally, a thickening agent and/or fragrance and/or at least one preservative.

Hair conditioner formulations of the present invention generally will contain an effective amount of ceramide or glycoceramide, an effective amount of cholesterol ester, and water. Preferably, such compositions will also contain an emulsifier system, at least one conditioning agent (which provides surface slip), and a preservative and, optionally, a fragrance, a sunscreen, or both.

Cleaning agents that may be used in the compositions of the present invention include, but are not limited to, sodium lauryl sulfate, ammonium lauryl sulfate, sodium lauryl sacrosinate, Triton-X-100® (Rohm and Haas Co.), and triethanolamine lauryl sulfate.

Thickening agents that may be used in the compositions of the present invention include, but are not limited to, hydroxypropyl methyl cellulose, carbopols (manufactured by B. F. Goodrich Co.), magnesium-aluminum silicates (e.g., Veegum®, manufactured by R. T. Vanderbilt Company, Inc.) and lauramide diethanolamine.

Any fragrances compatible with the particular vehicle utilized may be used in the compositions of the present invention.

Preservatives that may be used in the compositions of the present invention include, but are not limited to, imidazolinyl urea (available as Germall® 115, manufactured by Sutton Laboratories, Inc.), phenoxyethanol, methyl paraben, propyl paraben, butyl paraben, and combinations of two or three of the aforementioned parabens.

Emulsifiers that may be used in the compositions of the present invention include, but are not limited to, 10 parts by weight of beeswax and about 0.1 to 1.0 parts by weight of borax), and compositions consisting essentially of stearic acid and triethanolamine (e.g., about 1 to 15 parts by weight of stearic acid and about 0.1 to 2.0 parts by weight of triethanolamine).

Conditioning agents that may be used in the compositions of the present invention include, but are not limited to, hydrolyzed animal protein, panthenol, Merquat 500® (Merck & Co., Inc.), stearalkonium chloride, and Polymer JR® (Dow Chemical Co.).

Sunscreens that may be used in the compositions of the present invention include any recognized and approved sunscreen at appropriate levels.

The compositions of the present invention contain an effective amount of ceramide or glycocer amide and an effective amount of cholesterol ester, i.e., amounts that are effective to provide a protective or repair effect to the hair. The protective effect can be measured by measuring the amount of protein and amino acids that may be extracted from the hair by shampooing with a mild surfactant (e.g., 5% sodium lauryl sulfate). The greater the protective effect, the more difficult it is to remove protein and amino acids from the hair with such a surfactant.

Although even a relatively low concentration of ceramide or glycoceramide and a relatively low concentration of cholesterol ester are effective in the compositions of the present invention, the concentration of ceramide or glycoceramide in a composition of the present invention should desirably be at least about 0.1% percent by weight of the composition and the concentration of cholesterol ester should desirably be at least about 0.1% percent by weight of the composition. Ease of formulation, ease of application, and cost factors will determine the maximum desirable concentrations of these materials.

Generally, a preferred concentration of ceramide or glycoceramide in the compositions of our invention is from about 0.1% percent by weight to about 20% percent by weight of the composition. More preferably, the concentration ranges from about 1% to about 10% percent by weight of the composition.

Generally, a preferred concentration of cholesterol ester in the compositions of our invention is from about 0.1% percent by weight to about 10% percent by weight of the composition. More preferably, the concentration ranges from about 0.5% to about 5% percent by weight of the composition.

Preferably, the ratio of ceramide or glycoceramide to cholesterol ester will range from about 10 to 1 to about 1 to 1, more preferably from about 4 to 1 to about 2 to 1.

The frequency of application of the compositions of the present invention to the hair will depend on such factors as the condition of the hair, the age of the individual to whom the composition is to be applied and the vehicle used. Generally, the compositions of the present invention will be applied from one to several times per week (e.g., as a shampoo or conditioner).

Ceramides and glycoceramides are generally available as partially pure lipids derived from porcine skin, bovine brain, red blood cells, or plant extracts. A preferred source is bovine brain extract (available from Pentapharm, Inc, Bas l Switzerland).

Cholesterol esters are generally synthetic in nature and are available as ultra pure materials. Sigma Ch mical Co., Fisher Scientific and American Scientific Supply Inc. supply suitable mat rials.

The following non-limiting Examples illustrate various compositions of the present invention.

EXAMPLES

The following formulation are prepared by mixing together the ingredients listed below:

Example 1

SHAMPOO (Low Conditioning)

Parts By Weight	Ingredient
38.525	Deionized Water
33.800	Sodium Lauryl Sulfate
15.000	Henna
0.500	Methyl Paraben
0.300	Propyl Paraben
0.500	Imidazolidinyl Urea
0.100	Disodium EDTA
5.000	Sodium Laureth Sulfate
2.000	Lauramide DEA
2.000	Glycol Stearate
0.425	Citric Acid Anhydrous
0.100	Sodium Chloride
0.400	Ethoxydiglycol
0.100	F D & C Blue #1 (1.0% Aqueous Solution)
0.050	F D & C Yellow #5 (1.0% Aqueous Solution)
1.000	Ceramide (Sigma Chemical Co. C2137)
0.100	Cholesterol Sulfate (Sigma Chemical Co. 9523)
0.100	Galactosyl Ceramide (Pentapharm, Inc.)

Example 2

PROTECTIVE SHAMPOO (Conditioning)

Parts By Weight	Ingredient
51.89	Deionized Water
30.00	Ammonium Lauryl Sulfate
4.00	Ammonium Laureth Sulfate
1.00	Quaterium 24
0.15	Citric Acid
1.35	Hydrolysed Animal Protein (Croda Inc.)
3.00	Lauramid DEA
0.50	Isostearimide DEA
0.50	Steareth 20
0.20	Disodium EDTA
0.50	Methyl Paraben
0.30	Propyl Paraben
0.50	Imidazolidinyl Urea
0.50	Castor Oil
0.50	Lecithin
1.00	PEG-40 Lanolin
2.00	Igepal
0.10	Soybean Oil
0.10	Caprylic Triglyceride
0.40	Ethoxydiglycol
0.01	Chamomile
0.40	Disodium Copper EDTA
0.20	Cholesterol Sulfate

Parts Weight	Ingredient
0.20	Cholesterol Acetate (Sigma Chemical Co. C8628)
0.70	Galactosyl Ceramide

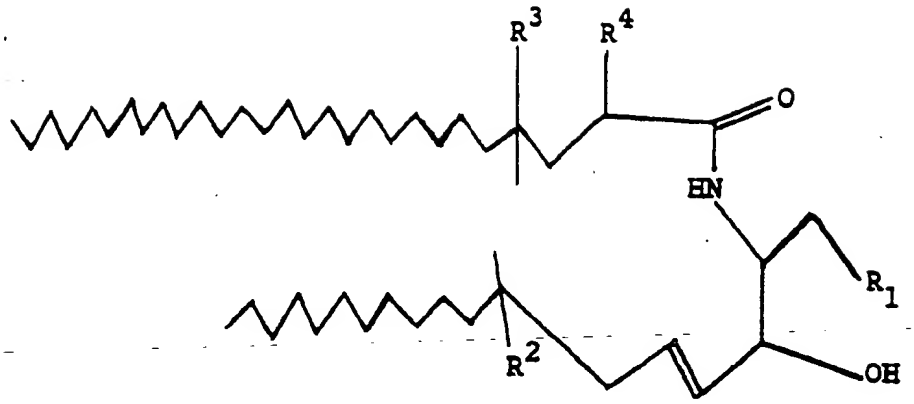
Example 3

HAIR CONDITIONER

Parts By Weight	Ingredient
91.95	Water
0.50	Propylene Glycol
0.20	Methyl Paraben
0.05	Propyl Paraben
1.40	Stearalkonium Chloride
3.00	Stearyl Alcohol
	Cetearyl Alcohol
	Steareth 20
	Glycol Distearate
	Dimethicone
0.35	F D & C Green #3
0.15	F D & C Yellow #5
0.15	F D & C Yellow #6
0.10	Cholesterol Acetate
0.30	Galactosyl Ceramide

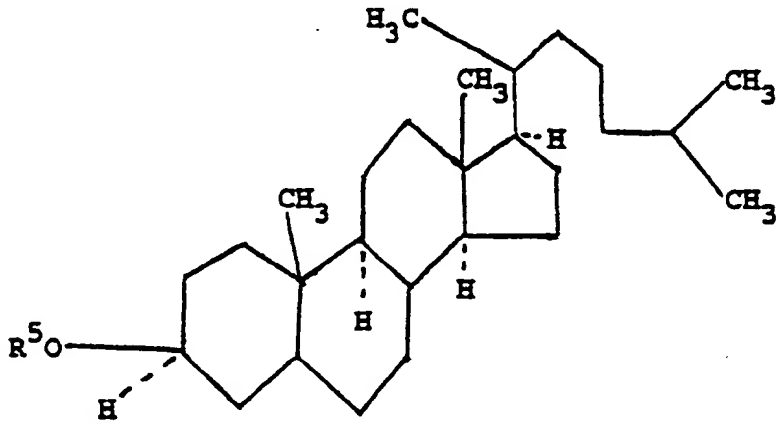
Claims

1. A hair protection composition comprising
a) at least one ceramide or glycoceramid having the formula



wherein R^1 is -OH, O-glucose$_n$ wherein n is an integer from 1 to 4, or O-galactose$_m$ wherein m is an integer from 1 to 8, R^2 is C_{11} to C_{14} alkyl, R^3 is C_{12} to C_{24} alkyl, and R^4 is hydrogen or hydroxy; and

b) at least one cholesterol ester of the formula



wherein R^5 is HOO_2SO-, CH_3COO-or $HOOC(CH_2)_pO$-wherein p is an integer from 9 to 17, and

c) a cosmetically accpetable vehicle.

2. A composition according to claim 1 additionally comprising water and a cleaning agent.

3. A composition according to claim 2 additionally comprising a thickening agent.

4. A composition according to any one of claims 2 and 3 additionally comprising a hair conditioning agent.

5. A composition according to any one of claims 2 to 4 additionally comprising a sunscreen.

6. A composition according to any one of claims 2 to 5 additionally comprising a preservative.

7. A composition according to any one of claims 2 to 6 additionally comprising an emulsifier.

8. A composition according to claim 1, wherein the concentration of ceramide or glycoceramide is at least about 0.1% by weight of the composition and the concentration of cholesterol ester is at least about 0.1% by weight of the composition.

9. A composition according to claim 1 wherein the concentration of ceramide or glycoceramide is from about 0.1% to about 20% by weight of the composition and the concentration of cholesterol ester is from about 0.1% to about 10% by weight of the composition.

10. A composition according to claim 1, wherein the concentration of ceramide or glycoceramide is from about 0.1% to about 10% by weight of the composition and the concentration of cholesterol ester is from about 0.5% to about 5% by weight of the composition.

11. A composition according to claim 8, wherein the concentration of ceramide or glycoceramide is at least about 0.2% by weight of the composition and the ratio of ceramide or glycoceramide to cholesterol ester ranges from about 4 to 1 to about 2 to 1.

12. A composition according to any one of claims 1, 8 and 10 wherein the ratio of ceramide or glycoceramide to cholesterol ester ranges from about 10 to 1 to about 1 to 1.

13. A composition according to claim 12, wherein the ratio of ceramide or glycoceramide to cholesterol ester rang s from about 4 to 1 to about 2 to 1.

14. A method of maintaining the integrity of the hair comprising applying to the hair the composition of any one of claims 1 to 13.